

2 CLAIMS

4 What is claimed is:

6 1. A telephone data collection device adapted to collect data from a telephone  
system having a data transmission interface through which data may be  
8 transmitted in an input protocol, said device comprising:  
a computer including a processor, program memory and data memory, data  
10 communication input and output interfaces connected to said processor, the  
input interface comprising an network interface,  
12 a software program loaded into program memory read and executed by the  
processor in implementing a network compatible data communication  
14 protocol for the network interface for data transfer to the computer through  
the network interface, said software program also transferring data received  
16 through the input interface between the input interface, data memory and the  
output interface, said software program further implementing a  
18 transmission protocol in program memory enabling transmission of data  
stored in said data memory through said output interface,  
20 wherein said computer receives data from a telephone system through the  
network interface employing a network protocol, buffers the data in data  
22 memory, and transmits said data to a host through the output interface in a  
communication protocol, the output interface and communication protocol

compatible with the host, converting said data received in one protocol to  
2 data transmitted in another protocol, as necessary, therein establishing data  
communication between the telephone system and the host.

4 2. The telephone data collection device of claim 1 wherein the output interface  
comprises a network interface.

6 3. The telephone data collection device of claim 1 wherein the output interface and  
the input interface are the same interface, receiving and transmitting data through  
8 the same network interface.

10 4. The telephone data collection device of claim 3 wherein data is collected the said  
same network interface by one set of software instructions and then transferred  
through said same network interface by another set of software instructions,  
12 therein separating the collection and transmission of data through said same  
network interface.

14 5. The telephone data collection device of claim 1 wherein the output interface  
comprises a serial interface.

16 6. The telephone data collection device of claim 1 wherein said input interface  
comprises a plurality of input interfaces and wherein the software program loads a  
18 selective communication protocol into program memory matching the input  
interface through which data is received.

20 7. The telephone data collection device of claim 6 wherein the input interface  
comprises a serial interface and an network interface.

22 8. The telephone data collection device of claim 1 further comprising a plurality of  
output interfaces wherein the software program loads into program memory a

selective communication protocol appropriate for the output interface through  
2 which data is transmitted.

9. The telephone data collection device of claim 8 wherein the output interface  
4 comprises an network interface.

10. The telephone data collection device of claim 8 wherein the output interface  
6 comprises a serial interface.

11. The telephone data collection device of claim 8 wherein the output interface  
8 comprises a telephone line interface.

12. The telephone data collection device of claim 1 wherein the software program  
10 further comprises an evaluation program adapted to analyze received data.

13. The telephone data collection device of claim 12 wherein said evaluation program  
12 includes analysis steps to detect alarm conditions.

14. The telephone data collection device of claim 13wherein data alarm report is  
14 transmitted through said data output interface.

15. The telephone data collection device of claim 14 wherein said data alarm report is  
16 transmitted through said data output interface along with data.

16. The telephone data collection device of claim 1 wherein said input interface is  
18 selectively connectable to any one of a plurality of telephone systems and said  
software program uniquely recognizes data received from each of said telephone  
systems, storing the data in data memory identifiable to each of said plurality of  
20 telephone systems.

22 17. The telephone data collection device of claim 1 wherein said output interface is  
selectively connectable to any of a plurality of host computers to which data in

data memory may be transmitted.

2       18. The telephone data collection device of claim 8 wherein said plurality of input  
          interfaces includes a telephone line interface.

4       19. The telephone data collection device of claim 18 wherein said telephone line  
          interface includes a PSTN interface employing a compatible PSTN protocol.

6       20. The telephone data collection device of claim 18 wherein said telephone line  
          interface includes a network interface employing a compatible network protocol.

8       21. The telephone data collection device of claim 1 further comprising one network  
          interface connectable to a host and another independent network interface  
          connectable to a PBX therein separating said one network that may experience  
          routing or network operational difficulties from said other network and any  
          routing or network operational difficulties that might be attendant to that network,  
          enabling said one network to continue to collect data from a PBX via the first  
          network interface and network while the other network interface and network that  
          is used to transfer data to the host is not operational.

10      22. The telephone data collection device of claim 1 wherein the processor in  
          communication with said data memory causes collected data to be stored in the  
          data memory until it has been successfully transferred to at least one host through  
          its output interface.

12      23. The telephone data collection device of claim 22 wherein said output interface  
          comprises a second network interface connectable to an associated network  
          connection, a telephone line interface, and a transmitting serial interface and  
          wherein the collected data is transferred to at least one host through at least one of

2 said second network interface and its associated network connection, said  
telephone line interface, or said transmitting serial interface.

4 24. The telephone data collection device of claim 1 wherein said output interface  
comprises a second network interface connectable to an associated network  
connection, a telephone line interface, and a transmitting serial interface and said  
6 software program further comprises instructions to send and receive data on said  
input and output interfaces, executing a variety of transfer protocols for the  
8 collection or transfer of data.

10 25. The telephone data collection device of claim 24 wherein said variety of transfer  
protocols include Xmodem, Zmodem, network File Transfer Protocol (FTP),  
12 Telnet, and Simple Network Management Protocol (SNMP) trap transmission  
protocols.

14 26. The telephone data collection device of claim 24 wherein the software program  
further comprises instructions to identify a protocol through which data is being  
transmitted by a PBX and initiating a matching data transfer protocol at said input  
16 interface for receiving said data.

18 27. The telephone data collection device of claim 24 wherein said protocols may  
include a protocol simulating an FTP client, enabling connection to a host  
operating as an FTP server and transfer of data using a FTP protocol, acting as an  
20 HTTP client and making a connection to a host operating as an HTTP server and  
transferring the data using an HTTP protocol or methods or acting as an HTTP  
22 server and transferring the data to an HTTP client using HTTP protocols and  
methods.

28. The telephone data collection device of claim 24 wherein said protocols may  
2 include a protocol simulating an HTTP client enabling a connection to a host  
operating as an HTTP server and transfer of the data using an HTTP protocol

4 29. The telephone data collection device of claim 26 wherein said variety of transfer  
protocols includes a protocol for the collection of data from a network-enabled  
6 telephone system.

30. The telephone data collection device of claim 24 wherein said variety of transfer  
8 protocols includes an evaluation program that analyzes collected data against pre-  
determined alarm conditions and criteria to determine if some portion of received  
10 data contains evidence of an alarm condition.

31. The telephone data collection device of claim 1 wherein said input network  
12 interface is connectable through the network to a plurality of PBX telephone  
systems.

14 32. The telephone data collection device of claim 1 wherein said output network  
interface is connectable through the network to a plurality of hosts that are to  
16 receive the data collected by the telephone data collection device.

33. The telephone data collection device of claim 2 wherein the input interface further  
18 comprises an input serial interface connectable to a PBX host transmitting data  
through a PBX serial interface, said data receivable through said input serial  
interface and transferable through the output network interface therein  
20 transferring the data transmitted from a PBX through a serial protocol for data  
communication to a receiving host through the output interface employing a  
22 protocol for data communication matching the output network interface.

34. The telephone data collection device of claim 33 wherein the output interface  
2 comprises an network interface employing an network protocol.

35. The telephone data collection device of claim 33 wherein the output interface  
4 comprises a telephone line interface employing the PSTN, the collected data  
transferring to said receiving host through the telephone line interface and the  
6 PSTN using appropriate protocols

36. The telephone data collection device of claim 35 wherein said protocols comprise  
8 Xmodem or Zmodem protocols.

37. The telephone data collection device of claim 1 wherein the software program  
10 includes instructions to emulate a receiving host compatible with a network-  
enabled telephone systems for receiving data therefrom, including configuration  
12 of protocol types and establishing a network connection.

38. The telephone data collection device of claim 37 wherein configuration  
14 information for use in establishing a network connection with a network-enabled  
PBX either in active or passive connection modes, port numbers and network  
16 addresses is contained in a configuration file stored in computer memory.

39. The telephone data collection device of claim 37 configured with multiple  
18 network addresses and ports and protocols providing data communication with a  
plurality of network-enabled telephone systems, the data received stored in the  
20 data memory.

40. The telephone data collection device of claim 39 configured with multiple passive  
22 or active data communication connections to a plurality of network-enabled  
telephone systems and hosts, respectively, enabling multiple simultaneously data

collection from said multiple network-enabled telephone systems and  
2 simultaneous transfer of data to said plurality of hosts.

41. The telephone data collection device of claim 40 configured to collect and process

4 alarm records simultaneously from a plurality of network-enabled PBX units and  
transmit alarm messages simultaneously to a plurality of hosts.

6 42. The telephone data collection device of claim 37 wherein the software program

8 includes instructions that configure the output interface for data transfer to a  
receiving host, implementing appropriate data transfer protocols as provided in a  
configuration file and loading FTP server functions as an initialization mode if a

10 FTP server protocol is enabled to run as a separate process in initializing a

network port and waiting for a connection to its FTP server upon which data is

12 transferred from the data memory to the receiving host, returning to its

initialization mode to prepare a new network port for connection and waiting for a  
14 new connection to be made to the FTP server when the data transfer is completed.

43. The telephone data collection device of claim 37 wherein the software program

16 includes instructions that configure the output interface for data transfer to a

receiving host, implementing appropriate data transfer protocols as provided in a

18 configuration file and loading telnet command-based server functions as an

initialization mode if a telnet server protocol is enabled to run as a separate

20 process in initializing a network port and waiting for a connection to its telnet

server upon which data is transferred from the data memory to the receiving host,

22 returning to its initialization mode to prepare a new network port for connection

and waiting for a new connection to be made to the telnet server when the data

transfer is completed.

2       44. The telephone data collection device of claim 37 wherein the software program  
4       includes instructions that configure the output interface for data transfer to a  
6       receiving host, implementing appropriate data transfer protocols as provided in a  
8       configuration file and loading server functions appropriate for that protocol as an  
10      initialization mode if data transfer protocol is enabled to run as a separate process  
      in initializing a network port and waiting for a connection to its matching server  
      upon which data is transferred from the data memory to the receiving host,  
      returning to its initialization mode to prepare a new network port for connection  
      and waiting for a new connection to be made to the matching server when the data  
      transfer is completed.

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